FINAL MEETING SUMMARY

HANFORD ADVISORY BOARD
TANK WASTE COMMITTEE
November 13, 2014
Richland, WA

Topics in this Meeting Summary

This is only a summary of issues and actions in this meeting. It may not represent the fullness of ideas discussed or opinions given, and it should not be used as a substitute for actual public involvement or public comment on any particular topic unless specifically identified as such.

Opening

Dirk Dunning, Tank Waste Committee (TWC) chair, welcomed the committee and introductions were made. The committee adopted the October 2014 meeting summary. The committee also conditionally adopted the March 2014 summary, noting that the discussion on Tank Waste Characterization and Staging should be recognized as incomplete.

Tank Farm Vapor Issues (joint w/ HSEP)

Introduction

Dirk noted that the tank farm vapor issues briefing was a joint effort between the TWC and the Health, Safety, and Environmental Protection Committee (HSEP). Dirk provided attendees with an introduction to members of the Hanford Tank Vapor Assessment Team (TVAT), noting that Bill Wilmarth, TVAT chair, and Andy Maier, TVAT vice chair, would provide a briefing on the report's background and findings. Dave Olson, Washington River Protection Solutions (WRPS) President and Project Manager, was also in attendance to provide follow-up and note next steps for tank farm vapor management.

*TVAT Briefing**

Bill provided a briefing from the TVAT perspective, noting the team's observations and recommendations. He stated that WRPS charged the TVAT with the task of determining if existing tank farm practices were adequately protecting workers from the adverse health effects that may result from exposure to chemical vapors. Bill recognized that the effort was an assessment, not a compliance audit. Bill and Andy's presentation covered the following main points:

- The research approach that was used as a basis for this study resulted from National Research Council recommendations. The assessment scope was broken into six technical areas; experts from each of these six areas were chosen to lead a segment of the assessment.

- TVAT began planning for this study in June 2014. Research efforts included two site visits and a review of thousands of WRPS documents. Site-visits provided the team with the opportunity to see industrial hygiene (IH) functions at the tank farms as they were occurring in real-time. The team also interviewed stakeholders (including representatives from state government, agencies, non-profit groups, and the HAB) and requested that they provide feedback on the issues that the report should include.

- To determine whether there is a causal link between vapor exposure and adverse health effects, the team utilized Hill's Criteria for Causation. This well-known framework was established many decades ago and is used primarily in the fields of toxicology and epidemiology.

- Following research and data collection efforts, TVAT arrived at four major conclusions: (1) the data strongly suggests a causal link between chemical vapor releases and subsequent adverse health effects experienced by workers, (2) adverse health effects are likely the result of acute exposure to high vapor concentrations, (3) IH programs that emphasize standard, full-shift exposure measurement and compliance cannot adequately address the complex and episodic nature of Hanford tank vapor incidents, and (4) addressing tank vapor exposure issues will require the full commitment of the Hanford Site leadership.

- Overall, the report noted 47 interdependent recommendations that fall into three overarching categories (Programmatic, Mechanistic Aspect of Exposure Scenario, and Abatement).

- The team recommends that occupational exposure limits should be established for acute exposure to vapors. WRPS should create an acute Chemicals of Potential Concern list to supplement the existing chronic Chemicals of Potential Concern list.

- Leadership at the Hanford Site made a strong commitment to worker safety by inviting the TVAT to conduct the assessment with full autonomy. In addition, WRPS requested that the assessment team follow up on the report by assessing WRPS's implementation plan, which should be provided to the TVAT for review by mid-November.

* Attachment 2: Hanford Tank Vapor Assessment Team Briefing (Savannah River National Laboratory Presentation)

- The TVAT provided over 20 briefings on the report, reaching over 1,500 tank farm employees.

*WRPS Perspective**

Dave Olson recognized that the TVAT report provided an important framework for future WRPS policies and practices as the organization works to supplement their chronic exposure program with an acute exposure program. He stated that implementing TVAT's recommended strategies would likely take four to five years and many millions of dollars. In the near-term, WRPS is taking steps to mitigate worker exposure to vapors (including respirator requirements and piloting infrared vapor-detection technology).

Dave noted that WRPS received an advanced draft of the TVAT report in September and began to immediately implement protection strategies based on the report's conclusions and recommendations. WRPS is committed to following implementation strategies through until tank farms are exposure-free.

Agency Perspectives

Brian Harkins, DOE-ORP, thanked the TVAT for their work and their presentation. He noted that DOE-ORP approves of the conservative approach that WRPS has adopted in approaching tank vapor issues and that DOE is supportive of WRPS's work moving into an implementation phase.

Tom Rodgers, Washington Department of Health (DOH), noted that DOH was very impressed with the TVAT's efforts. He added that DOH is interested in reviewing WRPS's implementation plan once it is released.

*Committee Questions and Responses**

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. What is the TVAT's impression of worker response to the report?

> *R. [TVAT] The text of the report has been downloaded over 2, 000 times, and many tank farm workers are taking the conclusions very seriously. During the TVAT briefings, workers were largely concerned about long-term health effects from vapor exposure.*
>
> *R. [WRPS] Workers noted that they are thankful that the study was carried out by a competent, independent team, and the study's recommendations were received positively. Workers were also interested in quick implementation of recommendations; they would like to move away from supplied air as soon as possible.*

Q. Did the TVAT discover any causal link between exposure and health effects? Are adverse health effects long-term or short-term in nature?

* Attachment 3: Response to Hanford Tank Vapor Assessment Team (TVAT) Report (WRPS Presentation)
* Attachment 1: Transcribed Flipcharts

R. [TVAT] The TVAT was not charged with doing any epidemiological inquiries along those lines. The analysis does not speak to a mechanistic aspect, it only speaks to a causal relationship.

R. [TVAT] The adverse health effects that have resulted from recent exposures are largely acute in nature. The team has recommended an additional epidemiological study to evaluate the relationship between acute and long-term effects.

Q. Did the TVAT look into air hoods as strategies for mitigation?

R. [WRPS] The tank farms do not currently have the infrastructure for manifold-fed or controlled breathing structures. WRPS is currently evaluating new technologies to help workers monitor vapors and control exposure.

Q. Several worker reports noted a coppery-smell at the tank farms. This is a very specific descriptor. Does the team have insight into what could have caused this type of odor?

R. [TVAT] There are several chemicals that could potentially produce this smell; however, metallic odors are also an effect of general stress. It would be very difficult to attribute this odor to a single chemical or series of chemicals.

Q. Parity between tank farms has always been difficult to achieve, as the compounds and rad loads are so variable between tanks. How can mitigation strategies realistically capture these variations? Does skin protection need to be addressed?

R. [TVAT] There is a lot known about the chemicals that are present in tank head spaces. There are chemical families that behave in very similar ways. The TVAT looked into inhalation exposure primarily; dermal exposure is a pathway that needs to be evaluated more fully.

C. I appreciate that vapor mitigation has started with self-contained breathing apparatus (SCBA) use. It is better to begin by taking too many precautions and then working down, as opposed to beginning with inadequate protective measures and working up.

R. [WRPS] This was the rationale behind SCBA use. Since switching to SCBA use upon tank farm entry, there have been no additional exposure incidents at the tank farms. However, SCBAs present their own hazards, and workers would like to move away from them as soon as it is feasible to do so.

Q. Can WRPS come back to the HAB following the release of the tank vapor mitigation implementation plan?

R. [WRPS] The implementation plan will include both physical and cultural aspects. The cultural efforts may be the more important of the two. WRPS can report back to the HAB following the release of this report.

Q. Could the Board be given copies of the Chemicals of Potential Concern lists? The committee has heard of several different lists over the past two weeks, noting different numbers of chemicals. Access to this information would be helpful moving forward.

R. [DOE-ORP] These lists will be provided to those interested.

C. Tank vapor exposure has been studied several times over the years. Mitigation efforts are never successful, because they never address the root problems. DOE and WRPS should look into emerging technologies and invest in robust systems for real-time monitoring.

Q. Have any questions come to the TVAT from a non-Hanford audience?

R. [TVAT] Briefings thus far have been done for WRPS employees. The TVAT has not done public briefings yet.

C. The general public is interested in these efforts. The TVAT should explore public presentations on the topic.

Q. How will WRPS and DOE-ORP ensure that tank farm protections maintain interest and funding in the long-term? Several Board members have expressed concern that funding for worker protection measures will be competing with tank farm operation funds.

R. [DOE-ORP] DOE and WRPS are committed to seeing this process through until the end of its life-cycle.

The committee thanked Dave Olson and the members of the TVAT team for their time. TWC and HSEP members identified that the topic is an important one that will require continued committee and Board attention, and the group recommended that the topic be revisited following the release of the WRPS implementation plan. Committee members recommended that the topic be split into two focus areas—one focusing on sampling and worker safety (to be addressed by HSEP) and one focusing on technical aspects (addressed by TWC). Members noted that the TVATs efforts were of a very high quality, and the committees recommended that the Board provide commendations for this work.

Direct Feed Low-Activity Waste Treatment Facility

*Agency Presentation**

Steve Pfaff, DOE-ORP, provided the committee with an introduction to the Direct Feed Low-Activity Waste (DFLAW) Treatment Facility, noting that the focus of the briefing would be concentrated on the Low-Activity Waste Pretreatment System (LAWPS). Steve stated that LAWPS is a capital project that is necessary for the DF LAW program. In his presentation, Steve noted the following main points:

- Capital project funds were request in 2013. In Fiscal Year (FY) 2014, DOE-ORP used a part of the tank farm budget to begin working on the conceptual design; however, moving forward, congress will need to approve the project as a line-item. The continuing resolution (CR) also makes this difficult. Under the CR, DOE-ORP cannot begin any capital projects that are considered to be new starts. The projected cost of the LAWPS project is $243-273 million.

* Attachment 4: Low-Activity Waste Pretreatment System (DOE-ORP presentation)

- DOE-ORP will need the capital dollars by March 2015, otherwise the project will be set back an additional year. DOE-ORP is using the funds that are currently available to keep the design team working together. DOE-ORP expects delivery of the conceptual design by December 2014. Following receipt, DOE-ORP will send the design to DOE headquarters for cost and strategy approval.

- Generally, the LAWPS Facility will allow both Low-Activity Waste (LAW) Vitrification Facilities to run at full capacity. LAWPS will remove suspended solids and cesium from double-shell tank (DST) liquids. The facility will use cross-flow filters. Liquid will run through the filters at a very high velocity (900 gallons per minute); solids will flow through directly, while liquids will be pulled out.

- Next, the filtered tank liquids would move to ion-exchange columns. The columns use resin to strip cesium from the liquid. Resin would be stripped with dilute nitric acid approximately two times per year. The spent resin is hauled away.

- The system is equipped with a robust leak detection system, which would automatically shut down pumps if leaks were to occur.

- One of the primary benefits of the LAWPS and the LAW is that the two facilities will allow limited waste treatment to come into operation and free much-needed tank space.

- DOE-ORP would like to see DFLAW actively treating wastes by 2022. The anticipated siting location of the LAWPS facility is to the northwest of the WTP area.

Agency Response

Suzanne Dahl, Washington Department of Ecology, stated that Ecology approves of the DF LAW concept. She also noted that Ecology supports the treatment of wastes and the production of glass as soon and safely as possible, especially considering limited DST space. Suzanne noted that while Ecology is ready to work on permitting for the facility, the agency does have some project management concerns that it would like to see addressed (e.g. funding, new-start feasibility, technical issues).

Suzanne recognized that Ecology is concerned about the design of the system. She noted that in the current design, there is a fair amount of technetium and iodine that end up in the melter off-gas system. This process could potentially impact groundwater, as designed. Ecology would like to ensure that the contaminants end up in the glass. Suzanne noted that the agency would like to see these concerns addressed.

*Committee Questions and Responses**

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

* Attachment 1: Transcribed Flipcharts

Q. The maps displaying the placement of the LAWPS Facility appear to have reserved additional space. Is this for future growth?

R. [DOE-ORP] The system is currently being designed to meet both LAW treatment facilities at full capacity. Future growth is currently not being planned for this Facility.

Q. Will the strontium in tank wastes be targeted by LAWPS?

R. [DOE-ORP] No, the strontium is precipitated out of the tank waste solution; therefore it is found at the bottom of the tanks. There may be some strontium that exists in the supernatant, but it would be filtered out by the system. Only liquids would move forward into the LAW Facility.

Q. What radionuclides will be present in LAW glass?

R. [DOE-ORP] Strontium and cesium are intended to end up in the High-Level Waste (HLW) treatment stream. All other radionuclides (largely technetium and iodine) could go to the LAW facility.

Q. What will happen to the cesium that is removed from the filtered liquid?

R. [DOE-ORP] A number of organic and inorganic options exist for removing and storing cesium. Savannah River stores cesium in resin, then grinds the resin and adds it to glass. This waste is considered to be high-level, and it is sometimes difficult to work with (it has a tendency to clump).

Q. What strategies were used by Hanford in the past to capture cesium?

R. [DOE-ORP] The cesium capsules that are currently stored at the Waste Encapsulation Storage Facility (WESF) *were captured via ion-exchange. DOE-ORP would like to capture remaining cesium in a glass form.*

R. [Ecology] The current cesium and strontium capsules stored at WESF are going to require additional efforts, as they are considered to be high-level waste. Therefore, this waste cannot stay in the state of Washington. Looking at cesium storage in the future, DOE needs to consider what will be done with these existing capsules (e.g. will they be broken up and placed into glass or will they be transported to a repository). This may impact treatment strategies.

Q. Is there an updated mass balance for the whole system?

R. [DOE-ORP] No. There is a One System organization from the tank farm and the WTP. Producing the integrated flow sheet is work that needs to be accomplished in the near-term; however, it is not available yet.

C. It is concerning from a worker health standpoint that the LAWPS design returns waste to the tank farms. Another evaporator facility would be helpful to the system.

Steve thanked the committee for their questions. He noted that DOE-ORP was interested in hearing from the TWC regarding alternative strategies for storing cesium and the regulatory framework within which these efforts was occurring. DOE-ORP does not seek HAB advice on this topic, but a report demonstrating thoughts and conclusions would be welcome.

Suzanne closed by stating that the State of Washington would likely not support cesium storage on-site long-term. Ecology expressed interest in working with DOE-ORP and the TWC further to determine the best way to move forward with a HAB report.

The TWC identified issue managers to begin exploring research on cesium removal, storage, disposition, and alternatives.

Committee Business

*Fiscal Year 2015 Work Plan**

Ryan Orth, EnviroIssues, noted that the FY 2015 Work Plan had been adopted by the Board during the November 2014 HAB meeting. The approved Work Plan incorporated the feedback that TWC members provided to committee leadership during the October meeting. The committee briefly visited each topic under TWC's purview and identified upcoming action and follow-up items.

TWC 3-Month Work Plan

The committee requested a meeting in January that will tentatively include the following topics:

- Update on WRPS's Tank Farm Implementation Plan
- Follow-up on cesium storage
- Risk-based retrieval, treatment, and closure

The committee agreed that they would clarify the January meeting agenda, further discuss committee business, and continue issue manager discussions during TWC's December committee call.

* Attachment 5: Tri-Party Agreement Agency Fiscal Year 2015 Work Plan—TWC-focused Topics

Attachments

Attachment 1: Transcribed Flipcharts

Attachment 2: Hanford Tank Vapor Assessment Team Briefing (Savannah River National Laboratory Presentation)

Attachment 3: Response to Hanford Tank Vapor Assessment Team (TVAT) Report (WRPS Presentation)

Attachment 4: Low-Activity Waste Pretreatment System (DOE-ORP presentation)

Attachment 5: Tri-Party Agreement Agency Fiscal Year 2015 Work Plan—TWC-focused Topics

Attendees

Board members and alternates:

Richard Bloom	Susan Leckband (phone)	Maynard Plahuta
Shelley Cimon	Larry Lockrem (phone)	Richard Smith (phone)
Dirk Dunning	Mike Korenko	Bob Suyama
John Howieson	Liz Mattson (phone)	Margery Swint
Steve Hudson (phone)	Emmett Moore (phone)	

Others:

Brian Harkins, DOE-ORP	Suzanne Dahl, Ecology	Bob Legard, CWB & CTC
Steve Pfaff, DOE-ORP	Heather John, Ecology	Ryan Orth, EnviroIssues
	Tom Rodgers, WDOH	Brett Watson, EnviroIssues
		Sharon Braswell, Northwind/DOE-ORP
		Michelle Searls, Northwind/DOE-ORP
		Andy Mayor, TVAT
		Bill Wilmarth, TVAT
		Dave Olson, WRPS